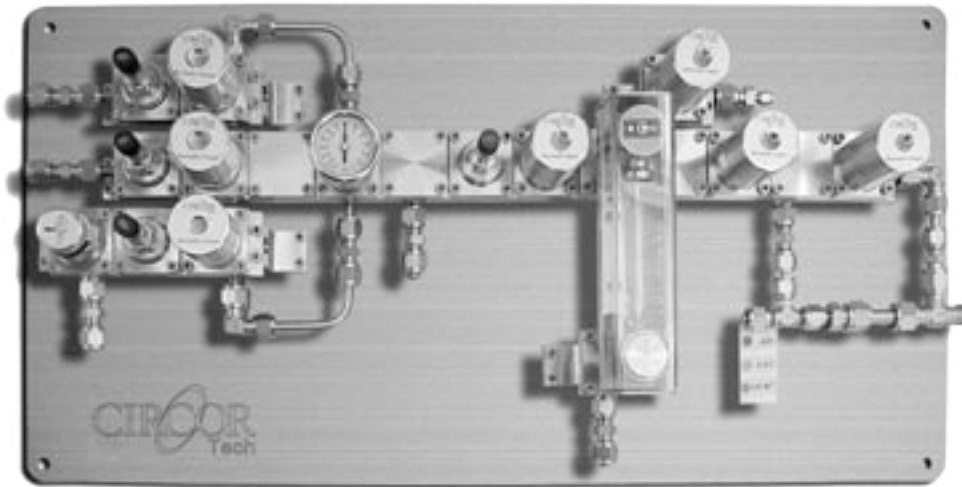


μMS³™

micro Modular Substrate Sampling System



The micro Modular Substrate Sampling System (μMS³™) was developed specifically for the Process Analytical Instrumentation market, and incorporates a building block and flow tubeset architecture for simplicity. The μMS³™ is the latest generation sampling system, an evolution of our original popular MS³ robust design. The μMS³™ System is a unique design that focuses on maximizing efficiency and minimizing costs. The flexibility of the block-and-flow-tubeset architecture makes it the perfect solution for any gas or liquid sample conditioning system, single or multistream.

Features & Benefits

Simple building block flow tubeset architecture

- Flexibility, lower inventory (fewer parts)
- Cost effective

Single block system: ANSI/ISA-76 compliant

- Simple and interchangeable
- Well-defined interface (standardized footprint)

Flow tubesets are pre-cut and electron-beam welded

- Quick, simple, low-cost assembly

Single type assembly tools (3/4" and 5/32" hex keys)

- Minimal training
- Simple assembly instructions

Unlimited multi-stream and block configurations

- Easily adapts to any system schematic

Ease of service & maintenance

- Minimizes down time

Complete set of surface mount components: (including diaphragm double-block-and-bleed, 3-way diaphragm valves, and 2- or 3-way ball valves) available on substrate

- Versatile
- Space-saving design
- Can be used with gas or liquid

Internal volume of average system is less than 1/100 of conventional systems

- Minimize sample lag time

Visible external flow path with elastomeric seal

- Logical troubleshooting

Quick response in design & production

- Short time frame for system completion

CIRCOR Tech

405 Centura Court • PO Box 4866 (29305) • Spartanburg, SC 29303

Phone (864) 574-7966 • Fax (864) 574-5608

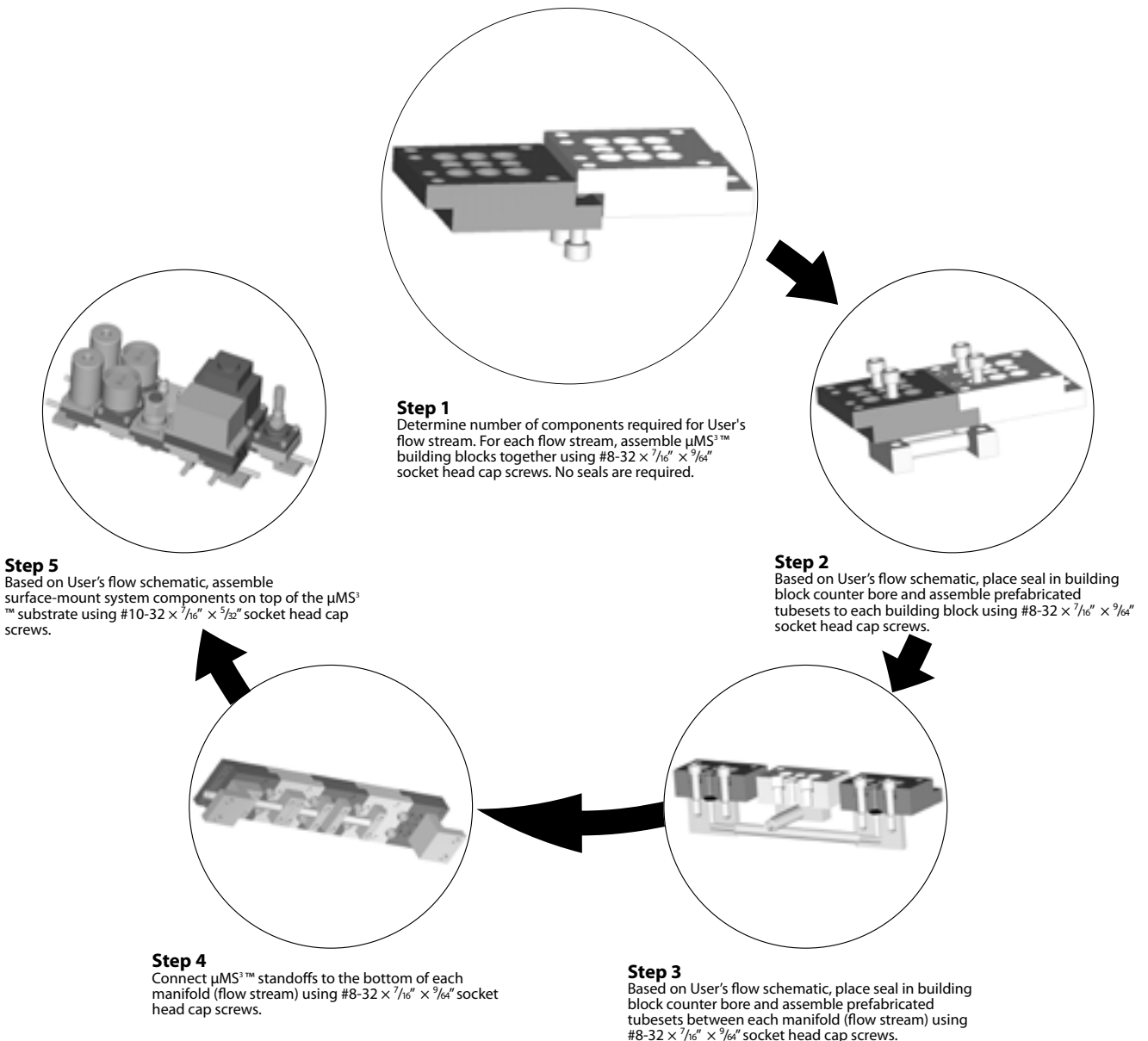
www.circortech.com

Technical Specifications

MAXIMUM WORKING PRESSURE	1000 psi (69.4 kg/cm ² ; 6900 kPa; 69 bar) tubesets and building blocks; components as quoted
WORKING TEMPERATURE RANGE	Viton® (standard): -20° F to +400° F (-29° C to +204° C) Kalrez® (optional): -40° F to +550° F (-40° C to +287° C) Parofluor® (optional): -50° F to +608° F (-40° C to +320° C) Teflon® (special): Consult with a CIRCOR Tech representative for ratings)
MATERIALS OF CONSTRUCTION (BLOCK AND TUBES)	316L stainless steel (standard) Monel®, Hastelloy® C-276 (optional)
LEAK RATE	1 × 10 ⁻⁶ cc/sec He (external)
ORIFICE SIZE	0.110" (2.79mm)
FLOW TUBE SIZE	¼" O.D. × 0.065" wall thickness; 0.120" I.D.
WELD PROCESS	Electron beam welding
CONNECTIONS (PROCESS) ON/OFF SUBSTRATE	¼" O.D. × 0.065" wall tubing provided for compression fittings or orbital welding
MOUNTING SCREWS	#8-32 × 7/16" socket-head cap block-to-block and tubeset mounting #10-32 × 7/16" socket-head cap discrete component mounting
NuBlu™ FLOW TUBE PASSIVATION (OPTIONAL)	Silcosteel® by Restek (www.restekcorp.com) Sulfinert® by Restek (www.restekcorp.com) Silcosteel®-CR by Restek (www.restekcorp.com)

From Building Blocks Flowsets to Sample Conditioning System

The μMS³™ is assembled using one type of tool, one type of screw, one size seal, one standard μMS³™ building block, μMS³™ flow tubesets, and μMS³™ standoffs.



μMS³™ Building Blocks & Flow Tubes



Building Block

One type of building block for all system configurations. Standard flow tubesets are pre-welded 316L stainless steel. Optional Silcosteel®, Silcosteel®-CR, and Sulfinert® are available upon request.

Block and tubeset architecture allows for assembly/reassembly into virtually any configuration.

External flow path allows for visual flow validation and logical troubleshooting.

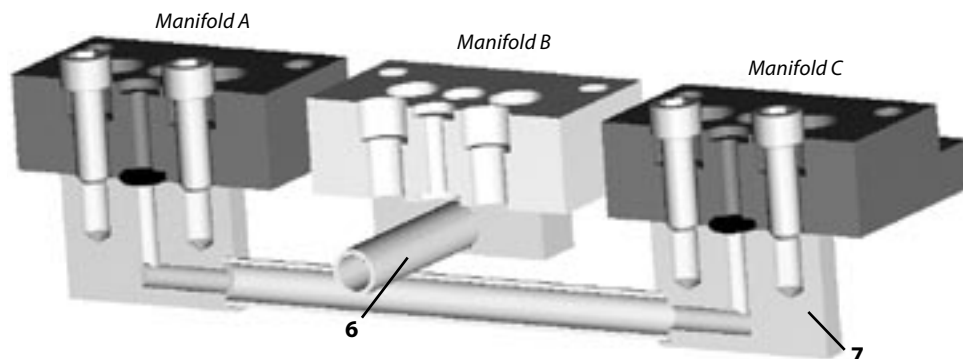
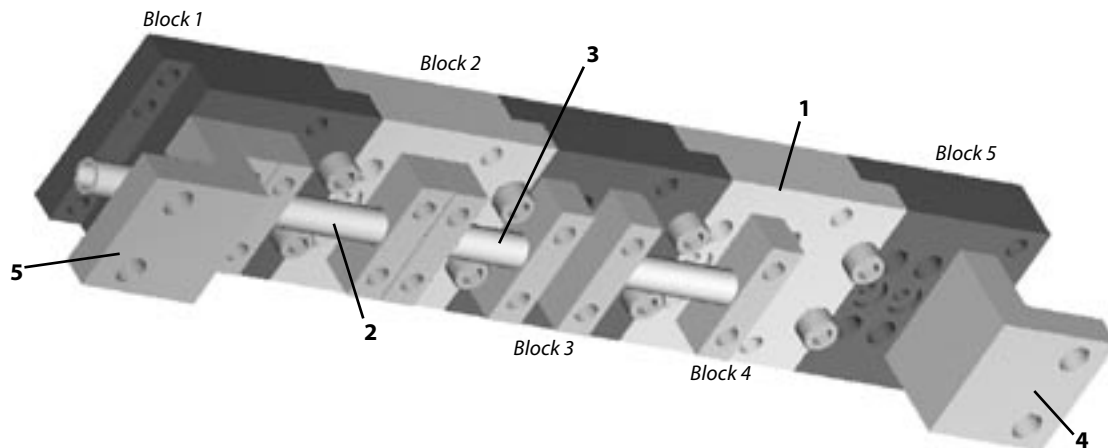


Flow Tubes

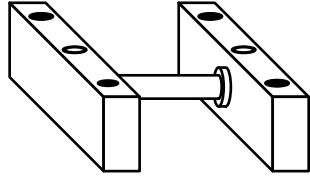
Key Substrate Components

1. Building block (Part # 112649)
2. Medium building block-to-block flow connector (Part # 112654)
3. Short building block-to-block flow connector (Part # 112655)
4. Standoff with no process connector (Part # 112654)
5. Standoff with integral on-axis building block-to-tubeset end connector
6. On-axis building block-to-tubeset end connector (Part # 112699)
7. Manifold-to-manifold no open end (long, manifold A-to-manifold C) (Part # 112689-2000B0)

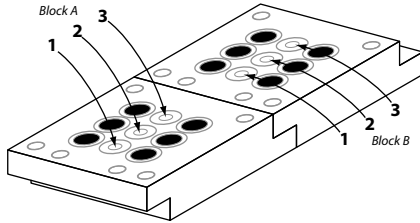
See page 4 or consult factory for other manifold-to-manifold and building block-to-block flow tubeset connections.



Building Block-to-Block Tubeset Connectors*

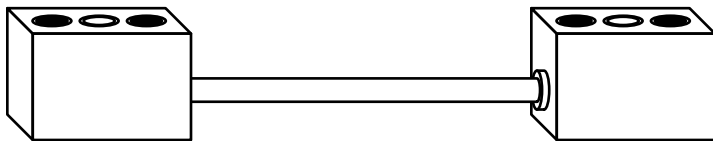


SIZE	TO CONNECT FROM BLOCK A...	TO BLOCK B	PART NUMBER
Short	#3	#1	112655
Medium	#2	#1	112654
Long	#1	#1	112981

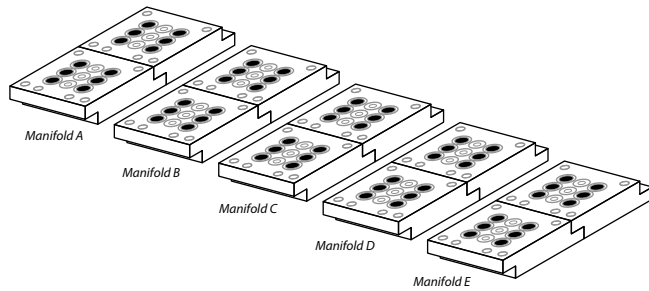


μMS³™ Building Block
Part # 112649

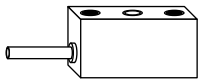
Manifold-to-Manifold Tubeset Connectors*



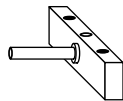
TO CONNECT FROM MANIFOLD...	TO MANIFOLD...	PART NUMBER
A	B	112689-2000A0
A	C	112689-2000B0
A	D	112689-2000C0
A	E	112689-2000D0



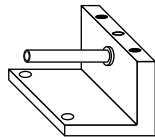
Other μMS³™ Components



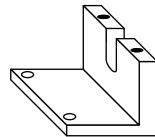
Off-axis manifold-to-tube end connector*
Part # 112689-1000A0



On-axis block-to-tube end connector*
Part # 112671



Standoff with integral on-axis block-to-tube end connector*
Part # 112669



Standoff with no process connector
Part # 112645



Standard -006 o-ring
Part # 58-006-50



Tube and block-to-block mounting screws
9/64" SHC #8-32 thread
Part # 113128



Discrete component mounting screw
5/32" SHC #10-32 thread
Part #

* All flow tubesets can be passivated with Silcosteel® and Sulfinert® passivated upon request.



CIRCOR Tech is capable of providing a complete system solution with the μMS³™. The following partial list of discrete components may be used on the top side of the μMS³™ :

- Pressure regulators (PR): back-pressure, pressure reduction, vacuum break, cylinder gas control
- 3-way valves (air-operated) (DV5)
- Double block & bleed valves (air-operated) (DBB)
- Metering valves (NV): 18 turn Vernier handle
- 2-way and 3-way manual-operated ball valves
- 2-way shutoff valves (manual or air-operated) (DV1)
- Pressure gauges and transducers, assembled with an ANSI/ISA-76-compliant conversion block
- Pressure and flow switches, assembled with an ANSI/ISA-76-compliant conversion block
- Filters: swirl-type, bypass-type, coalescing, liquid barrier and polishing
- Mass flow and line pressure controllers (NEC/NFPA and ATEX explosion-proof)
- Rotameters: ball-and-tube flowmeters
- Oxygen analyzer: PCT, PPM
- Moisture analyzer: PPM and break-thru detection
- Spectrophotometer cell: 0.10–110.0mm MIR path lengths available (UV, VIS, NIR)
- Refractive Index analyzer
- Meter flow components are connected to the μMS³™ using off-manifold tubesets
- Pressure and flow controllers: explosion-proof

These components are available directly from CIRCOR Tech or from other quality manufacturers. Any component not shown in the above list can be easily accommodated by the μMS³™ System if it is ANSI/ISA-76-compliant or through the use of μMS³™ off-manifold tubesets.

D Series Valves



D Series Valves are compact, modular diaphragm valve assemblies that can be used in shutoff, switching, block and bleed, GC, and sample point applications. For more information see the CIRCOR Tech D Series catalog (Part # CTDV).

Ordering Process

The μMS³™ system is a “build to order” solution with pricing and availability based on customer-specific design requirements. The simplicity of the μMS³™ substrate building block-and-flow-tubaset architecture allows for several different methods of designing and delivering a complete μMS³™ System.

The most common method:

- Customer provides CIRCOR Tech with a System Flow Schematic (Figure A).
- From this schematic, CIRCOR Tech creates a Manifold Flow schematic (Figure B) for customer approval.
- A quotation is then generated for the system so an order can be placed.
- Upon order placement, a Component System Drawing (Figure C) is created for customer documentation.

A second method of ordering made possible by the simplicity of μMS³™ architecture:

- Analyzer Engineer, Integrator, or End User can order quantities of the simple μMS³™ substrate components.
- With minimal training and parts “on hand”, user can design and quickly assemble their own system.
- Quick modification to virtually any sample conditioning system configuration is possible with a few key μMS³™ substrate components on hand.

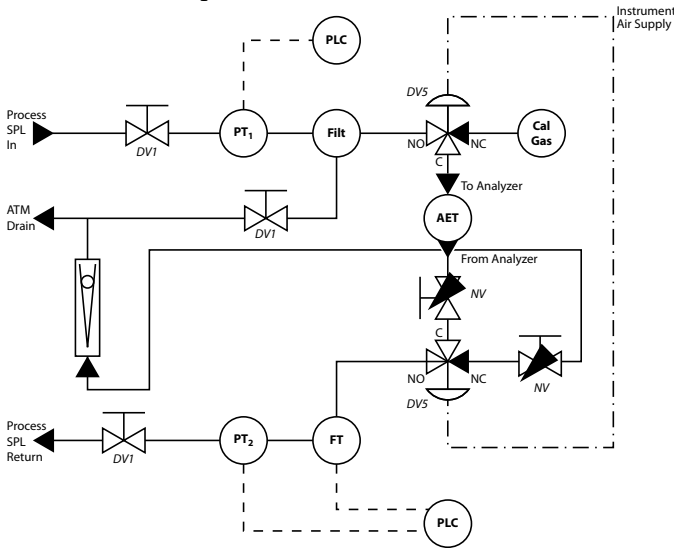


Figure A
Customer System Flow Schematic

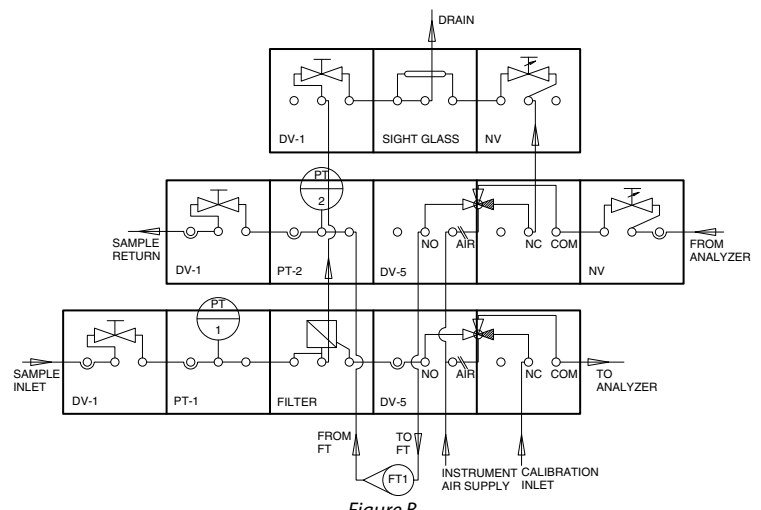
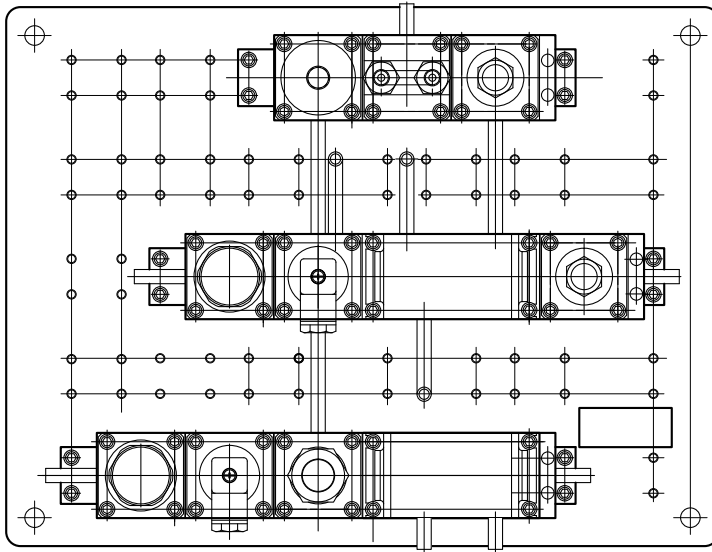
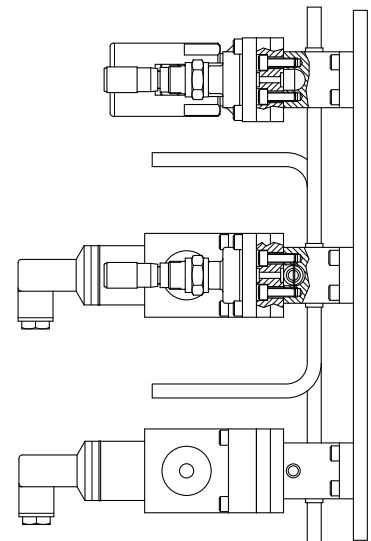


Figure B
Manifold System Flow Schematic



(Plan View)



(End Elevation View)

Figure C
μMS³™ customer
documentation drawings

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 Teflon® is a registered trademark of DuPont.
 Silcosteel®, Silcosteel®-CR and Sulfinert® are registered trademarks of Restek Corporation.

Sample Composition

	MINIMUM	NORMAL	MAXIMUM	CONCENTRATION UNITS
Measured Component:				
Balance of Stream				
Optional Silcosteel®-CR or Sulfinert® passivation required? Yes No (Circle one)				

Sample Stream (Source / Bypass) Conditions

	MINIMUM	NORMAL	MAXIMUM	MEASUREMENT UNIT
Pressure				PSI or BAR
Temperature				°F or °C
Particulates/Condensibles	Yes or no			
Dew Point Temperature (when gas turns into liquid)				°F or °C
Bubble Point Temperature (when liquid turns into gas)				°F or °C
Specific Gravity (specify units)				
Distance (source to sample system)				ft or m
Sample Transfer Line Size				in or mm
Sample Transfer Flow Rate				SCFM or L/min
Sample Bypass/Fast Loop Flow Rate				SCFM or L/min
Sample to Analyzer Flow Rate				SCFM or L/min

Sample Stream (Return) Conditions

	MINIMUM	NORMAL	MAXIMUM	MEASUREMENT UNIT
Pressure				PSI or BAR
Temperature				°F or °C
Distance (sample system to return point)				ft or m

Calibration Material

	MINIMUM	NORMAL	MAXIMUM	MEASUREMENT UNIT
Pressure				PSI or BAR
Temperature				°F or °C
Gas or Liquid				
Working Pressure of Analyzer				PSI or BAR
Working Temperature of Analyzer				°F or °C

Electrical Hazard Rating

North America: (NEC/NFPA)	Class:	Group:	Division:
International:	Agency:	Classification:	
International Temperature Code (T) rating:	Europe: T1 T2 T3 (circle rating)	Canada: T1 T2 T3 T4 T5 T6 (circle combination) A B C D	

Enclosure Rating

North America	NEMA
International	IP
Temperatures	Ambient Range: Interior: °F or °C

Contact Information

CIRCOR Tech Agent	Project Reference
End User Name	End User Process Type
Distributor Contact Person	
Name	Telephone
E-mail	Fax
Required Quotation Date	Required System Delivery Date

Please attach customer's flow schematic/drawing



405 Centura Court
PO Box 4866 (29305)
Spartanburg, SC 29303
Tel (864) 574-7966
Fax (864) 587-5608

Circle Seal Controls, Inc.

2301 Wardlow Circle
PO Box 3300
Corona, CA 92880
Tel (951) 270-6200
Fax (951) 270-6201
www.circle-seal.com

GO Regulator

405 Centura Court
PO Box 4866 (29305)
Spartanburg, SC 29303
Tel (864) 574-7966
Fax (864) 587-5608
www.goreg.com

HOKE, Inc.

405 Centura Court
PO Box 4866
Spartanburg, SC 29303
Tel (864) 574-7966
Fax (864) 587-5608
www.hoke.com

CIRCOR Instrumentation, Ltd.

1-3 Bouverie Road
Harrow
Middlesex, HA1 4HB
UK
Tel +44 (0) 20 8423 0113
Fax +44 (0) 20 8864 7008
www.circor.co.uk

HOKE Controls

1901 Lynx Place
Ontario, CA 91761
Tel (909) 923-3770
Fax (909) 923-2550

Panels Plus

1901 Lynx Place
Ontario, CA 91761
Tel (909) 923-3770
Fax (909) 923-2550
www.circor-panelsplus.com

CIRCOR Tech

405 Centura Court
PO Box 4866 (29305)
Spartanburg, SC 29303
Tel (864) 574-7966
Fax (864) 587-5608
www.circortech.com

HOKE GmbH

Weitzesweg 11
Postfach 15 41
D-61118 Bad Vilbel-Dortelweil
Germany
Tel +49-6101-82 56 0
Fax +49-6101-82 54 0
www.hoke.de

TOMCO

51 Zima Park
PO Box 4866 (29305)
Spartanburg, SC 29303
Tel (864) 574-7966
Fax (864) 587-5608
www.tomcoquickcouplers.com

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